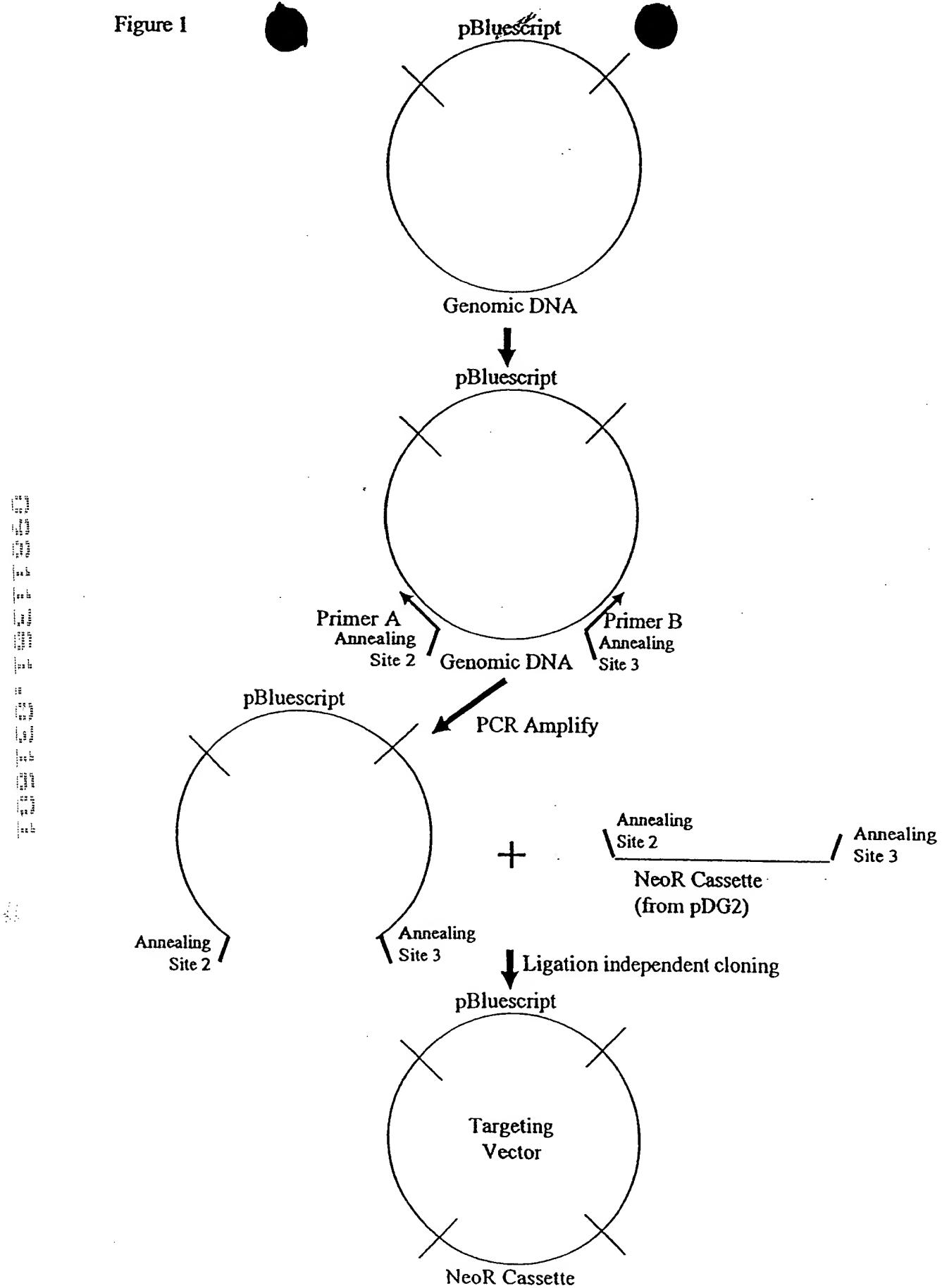


Figure 1



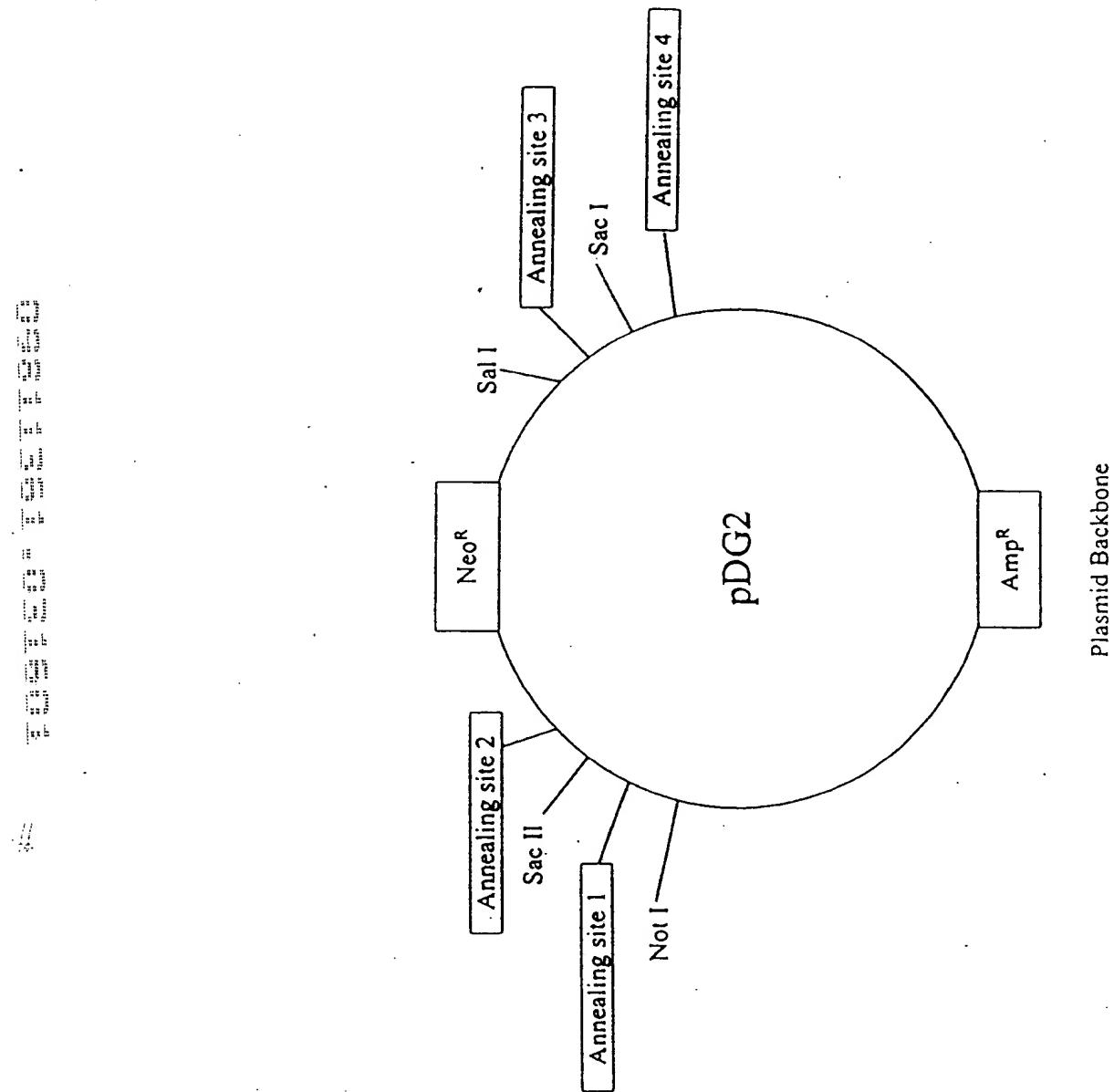


FIGURE 2A

FIGURE 2B

PDG2:

GTAACTACGTCAAGTGGCACTTTGGGAAATGTGGCGGAACCCATTGTTATTTCTAAATACATTCAAATA
TGTATCCGCTCATGAGACAATAACCTGATAAAATGCTCAATAATATTGAAAAGGAAGAGTATGAGTATTCAACATTTC
CGTGTGCCCTTATTCCCTTGGCATTGGCTTCTGTTTCTGCTCACCCAGAAACGCTGGTGAAGTAAAGTAAAGA
TGCTGAAGATCAGTTGGTGACGAGTGGGTTACATCGAATCTCAACAGCGTAAGATCCTTGAGAGTTTCGCC
CCGAAGAACGTTCTCCAATGATGAGCACTTTAAAGTCTGCTATGGCGCGTATTATCCGTGTTGACGCCGGCAA
GAGCAACTCGGTGCGCGATAACACTATTCTCAGAATGACTTGGTGAAGTACTCACCAGTCACAGAAAAGCATCTTACCGA
TGGCATGACAGTAAGAGAATTATGCACTGCTGCCATAACCATGAGTATAACACTGCGGCCAATTACTCTGACAACGA
TCGGAGGACCGAAGGAGCTAACCGTTTTGCAACACATGGGGGATCATGTAACCTGCCCTGATGTTGGAACCGGAG
CTGAATGAAGCCATACCAACGACGAGCGTGACACACAGATGCCCTGAGCAATGGCAACAACTGCGCAAACACTATTAAAC
TGGCGAACTACTTACTCTAGTCTCCCGCAACATTAATAGACTGGATGGAGCGGATAAAGTGTGAGGACCACTCTGC
GCTCGGCCCTCCGGCTGGCTTATTGCTGATAAATCTGGAGCGCTGGGCTCGCGGTATCATGAGCA
CTGGGGCCAGATGGTAAGCCCTCCGTTACCTGAGCAGACGGGAGTCAAGGCAACTATGGATGAACGAAATAG
ACAGATCGCTGAGATAGGTGCTCACTGATTAAGCATTGGTAAGTGTAGCAGACCAAGTTACTCATATATACTTGTG
ATTACCCCGGTTGATAATCAGAAAAGCCCCAAAAGGAAAGATTGATAAGCAAATTATTTGTAACGTTAACTTGTG
TTTGTAAAATTGCTTAAATTGTTGTTAAATCAGCTCATTTTAAACCATAGGCCAAATCGGAAAACCTTAT
AAATCAAAGAATAGCCGAGATAGGTTGAGTGTGTTCCAGTTGAAACAAGGTCCACTATTAAAGAACGTGGACTC
AAACGTCAAAGGCGAAAACCGTCTATCAGGGCATGGCCACTACGTGAAACCATACCCAAATCAAGTTTGGG
CGAGGTGCGTAAGCACTAAATCGAACCCCTAAAGGAGCCCCGATTAGAGCTGACGGGAAAGCGAACGTGGCG
GAAAGGAAGGGAAGAAAGCGAAAGGAGCGGGCGTAGGGCGCTGGCAAGTGTAGCGGTACCGCTGCGCTAACACCA
CCCGCCGCGCTTAATGCGCCGCTACAGGGCGCTAAAGGATCTAGGTGAAGATCCTTTGATAATCTCATGACCAAA
TCCCTTAACGTGAGTTTGTCTTCACTGAGCGTCAAGCCCGTAGAAAAGATCAAAGGATCTCTGAGATCCTTTT
CTGCGCTAATCTGCTGTTGCAAACAAAAAAACCCCGTACAGGGGTGGTTGTTGCGGATCAAGAGCTACCAAC
TCTTTTCCGAAGGTAACTGGCTTCAGCAGAGCGAGATACCAAATACTGTTCTCTAGTGTAGCCGTAGTTAGGCCACC
ACTTCAAGAACTCTGAGACCGCTACACCTCGCTCTGCTAATCTGTTACAGTGTGGCTGCGCAGTGGCGATAAG
TCGTGTCTTACCGGTTGGACTCAAGACGATAGTACCGGATAAGGCCAGCGGTGGCTGAACGGGGGGCTCGCAC
ACAGCCCAGCTGGAGCGAACGACCTACACCGAATCGAGATACCTACAGCTGAGCTATGAGAAAGGCCACGCCCTCC
AAGGGAGAAAGGCGACAGGTATCCGGTAAGCGGAGGGCTGGAAACAGGGAGGCCACGCCAGGGAGCTTCAGGGGAAAC
GCCGGTATTTAATCTGCTGGGTTTCCGACCTCTGACTTGAGCGTCAAGGGGGGGGGGGGGGGGGGGGGGGGG
GAGCCTATGAAAACCGCAGCAACGCCCTTTACGGTTCTGGCTTTGCTGGCTTTGCTCACATGTAATGT
AGTTAGCTCACTCATAGCACCAGGTTTACACTTTATGCTTCCGGCTGTTGAGGAGGTTGAGCGGATA
ACAATTTCACACAGGAAACAGCTATGACCATGATTACGCCAAGCTACGTAATACGACTCACTAGGGGCCGTTAAC
AATGTGCTCTTTGGCTGTTCCGGGCCAGCCAGACAAGAACAGTTGACGTCAAGCTCCGGGAGCGCTGCT
AGCGGCCGCGCGAATTCTGCAAGGATTGAGGGCCCTGAGGTCAATTCTACCGGGTAGGGAGGCCCTTCCCAAG
CAGTCTGGAGCATGCGCTTACGAGCCCGCTGGACTTGGCGTACACAAGTGGCTCTGGCTCGCACACATTCCA
TCCACCGTAGCGCAACCGCTCCGTTTTGGGCCCTTCGCGCCACCTCTACTCTCCCCTAGTCAGGAAGTTC
CCCCCGCCCGCAGTCGCGTGTGCAAGCGTACAATGGAAAGTAGCAGCTCTACTAGTCGTCAGATGGACAG
CACCGCTGAGCAATGGAAGCGGTAGGCCCTGGCAGGGCCAATAGCAGCTTGTCTCCGCTTCTGGCTCAGA
GGCTGGGAAGGGGTGGTCCGGGGCGGGCTCAGGGCGGGCTCAGGGGGGGGGCGGAAGGTCTCCCGAGGCC
GGCATTCTCGCACGCTTAAAGCGCACGCTGCCGCTGTTCTCTCTCATCTCCGGCTTCTGGCTCAGCAG
CAATATGGGATCGGCCATTGAAACAAGATGGATTGACCGAGGTCTCCGGCTGTTGGGGAGGGCTATTGGCTATG
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TGATCTGGACGAAGAGCATCGGGCTCGCGCCAGCGAACCTGCTGAGCGGGCTGCTGAGCGTCAAGGGCG
ATCTCTGCTGACCCATGGCATGCTGTTGCGAAATATCATGGTGGAAATGGCCGTTTCTGGATCATGACTGT
GGCGCGTGGGTGTTGGGGACCGCTATCAGGACATAGCGTTGGCTACCCGCTATGCTGAGGAGCTTGGCG
GGCTGACCGCTTCTCGTGTGTTACGGTATGCCGCTCCGATCGCAGCGCATGCCCTTATGCCCTTGTG
TCTTCTGAGGGGATCGATCCGCTCTGTAAGTCTGAGAAATTGATGATCTATTAAACAATAAGATGTC
AAGTTTTCTGTCTACATTGTTAAAGAAGGGTGAGAACAGAGTACCTACATTGAAATGAGGATTGGAGCTACGGGG
GTGGGGGTGGGTGGGATTAGATAATGCTGCTTACTGAGGCTTACTATTGCTTATGATAATGTTCTAG
TTGGATATCATATAATTAAACAACAAACCAATTAAAGGCCAGCTCATTCTCCACTCATGATCTATAGATCTATAGA
TCTCTCGTGGATCATTGTTCTGATTCCTGTAAGTCTGAGAAATTGATGATCTATTAAACAATAAGATGTC
AAGTTTTCTGTCTACATTGTTAAAGAAGGGTGAGAACAGAGTACCTACATTGAAATGAGGATTGGAGCTACGGGG
GTGGGGGTGGGTGGGATTAGATAATGCTGCTTACTGAGGCTTACTATTGCTTATGATAATGTTCTAG
TTGGATATCATATAATTAAACAACAAACCAATTAAAGGCCAGCTCATTCTCCACTCATGATCTATAGATCTATAGA
TCTCTCGTGGATCATTGTTCTGATTCCTGTAAGTCTGAGAAATTGATGATCTATTAAACAATAAGATGTC
TAGCCGCTGAAAGACGAGATCGCAGCCCTCTGTTCCACATACACTCTCATGTCAGTATTGTTGCCAAGTCTAATTCCAT
CAGAAGCTGACTCTAGATCTGGATCCGGCAGCTAGGCCGCTGCCACGCTGAGTGTAGCTGGTACCAAGGCTCTGCTGTG
TCCGTTGAGCTCGCAGCACAGGACACAGGCAACGCAAATTAAATTAAGGCCGCGTACCCCTAGTCAGGCCCTTAACT
TATTACGGACTGGCGTGTGTTACACGTCGTAAGTGGAAAACCCCTGGCGTTACCCACTTAATGCCCTGAGCACA
TCCCTTCCGCAAGCTGGCGTAATAGCGAAGAGGCCGACCGATGCCCTCCAAACAGTTGCGCAGCCTCAATGGCG
AATGGCGCTTCCGTTGGTAATAAGGCCGCTTGGGGTTTTTTTT

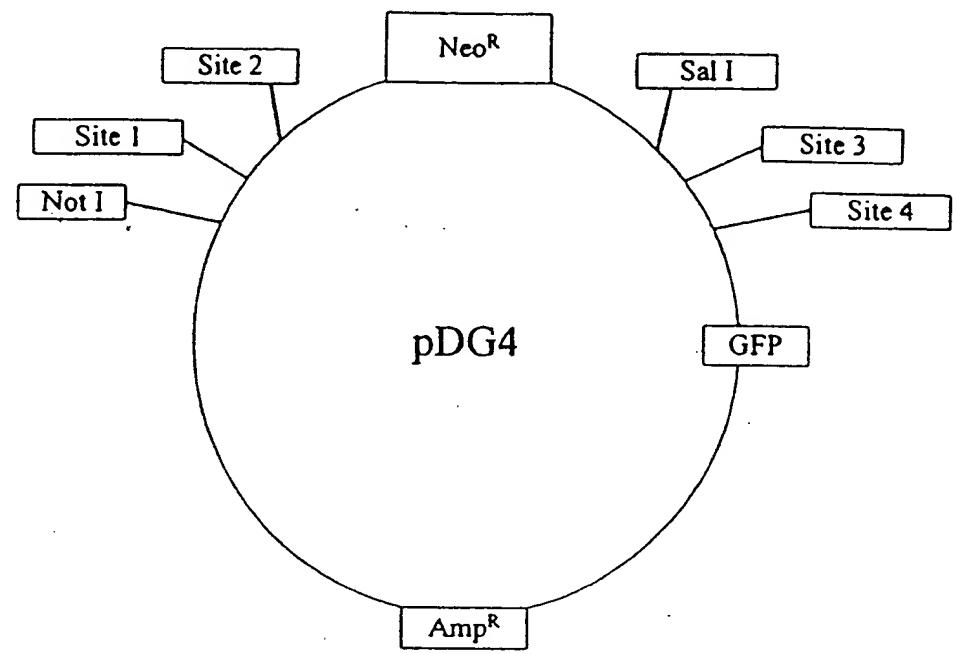


FIGURE 3A

FIGURE 3B

PDG4:

TGCTCCCTGCCGAGAAAGTATCCATCATGGCTGATGCAATGCGCGGCTGCATACGCTTGATCCGGCTACCTGCCCATTCG
ACCAACCAAGCGAAACATCGCATCGAGCGAGCACGTACTCGGATGGAAGCCGGCTTGTCGATCAGGATGATCTGGACGAA
GAGCATCAGGGCTCGCGCCAGCGAACCTGTTGCCAGGCTCAAGCGCGCATGCCGACGGCGATGATCTCGTCGTCGAC
CCATGGCGATGCCGCTTGCGAATATCATGGTGAAAATGGCCGCTTTCTGGATTATCGACTGTGGCCGGCTGGGTG
TGGCGGACCGCTATCAGGACATAGCGTTGGCTACCGTGTATGGCTGAAGAGCTGGCGCGAATGGGCTGACCGCTTC
CTCGTGTCTTACGGTATGCCGCTCCGATTCGCAAGCGCATCCCTCTATGCCCTCTTGACGAGTTCTCTGAGGGGA
TCGATCCGCTCTGTAAGTCTGCAAGAAATTGATGATCTATTAACAAATAAAGATGTCACCTAAATGGAAGTTTCTCTGT
CATACTTTGTTAAGAAGGGTGAGAACAGAGTACCTACATTGTAATGGAAGGATTGGAGCTACGGGGTGGGGTGGGGT
GGGATTAGATAAAATGCCGCTCTTACTGAAGGCTCTTACTATTGCTTATGATAATGTTCATAGTTGGATATCATAA
TTAAACAAAGCAAAACCAAAATTAAAGGGCCAGCTCATCCCTCCACTCATGATCTATAGATCTATGATCTCTCGTGGGAT
CATTGTTTCTCTGATTCCCACTTTGTTCTAAGTACTGTGGTTCCAAATGTGTCAGTTTCAAGCCTGAAGAAC
GAGATCAGCAGCCTCTGTTCCACATAACTTCATTCTCAGTATTGTTGCCAGGTTCTAAATCCATCAGAAGCTGACTC
TAGATCTGGATCCGGCCAGCTAGGCCGTCGACCTCGAGTGTACGGTACCAAGGTCTCGCTCTGTCGTTGAGCTCG
ACGACACAGGACACGCAAATTAAAGGCCGGCCGTACCCCTAGTCAGGCTTAAGTGAGTCGTTACGGACTGG
CCGTGTTTACAAACGTGACTGGAAAACCTGGCTAACCAACTTAATGCCCTTGAGCACATCCCCCTTCCGC
AGCTGGCGTAATAGCGAAGAGGCCGACCGATGCCCTTCCAAACAGTTGCGCAGCCTGAATGGCGAATGGCGCTTCGC
TTGGTAATAAAGGCCGCTTCGGCGGGCTTTTTTTT

FIGURE 3B (Continued)

Annealing site	Sequence	Sequence after digestion
1	5' tggctccctttggcttgccaa... 3' 3' acacgaggaaaccgaacgaaagg... 5'	5' tggctccctttggcttgccaa... 3' 3' ctggttttgttggcttgccaa... 5'
2	5' ctggttttgttggcttgccaa... 3' 3' gaccaaaacaaacgaccgaaacc... 5'	5' ctggttttgttggcttgccaa... 3' 3' 5' 5'
3	5' ggtccctcgctctgttccgtt... 3' 3' ccaggaggcgagacacaggcaact... 5'	5' ggtccctcgctctgttccgtt... 3' 3' tt... 5'
4	5' ttggctgttccctgttcgtcga... 3' 3' aaacggcacaggacacaggcagg... 5'	5' ttggctgttccctgttcgtcga... 3' 3' tt... 5'

FIGURE 4

Annealing site	Sequence		Sequence after digestion	
1	5'	AAtgtgctccctttggcttgcttCCGC	3'	5' AA
	3'	Ttacacggaggaaaaccgaaacgaaagg	3'	Ttacacggaggaaaaccgaaacgaaagg 5'
2	5'	AAActggttcttctgttggcttggCCGC	3'	5' AA
	3'	Ttgaccaagaacaaacgacccggg	3'	Ttgaccaagaacaaacgacccggg 5'
3	5'	AAggtcctcgctctgttccgttGAGCT	3'	5' AA
	3'	Ttccaggaggcggacacaggcaac	3'	Ttccaggaggcggacacaggcaac 5'
4	5'	AAttgcgtgtcctgtgtcGAGCT	3'	5' AA
	3'	Ttaaacggcacaggacacaggcagg	3'	Ttaaacggcacaggacacaggcagg 5'

FIGURE 5

FIGURE 6

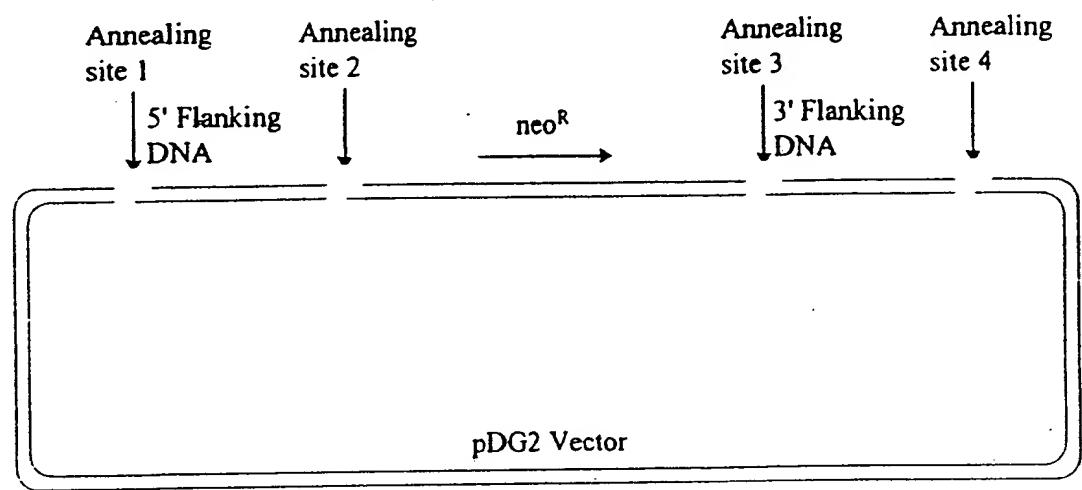
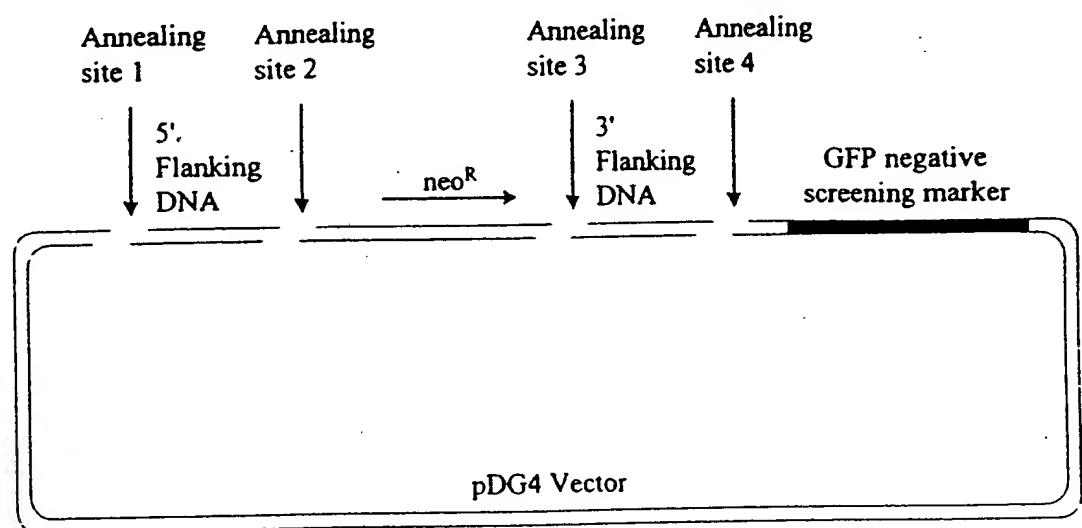


FIGURE 7



TCGGTTGGGCCAGCAACTCTAGCAAGCAGGCTACCCCTAGGACCATCCATATCCGATGAGCTACAG
TGGCTGCCCTCACTATGCCGTGTCGTGGCGGCCCTCAAGAAGGAGTCTCAGGTAGATGGGCCCTGG
AGAGGATCCAACAGGTGTTGGCCCTCGCTCCAGTGCAGGTGAGATGGGACAGCAGCAGTGGAAACAT
TATGGCATCTATGCCCTGCAATGGCTGCAGTGGCTCTCAAGAGGAGTGTGAGAAGGAGGCTCATCTACA
GGTCCAAGTCGGGGCAGGGATGTGCCAGTGGATAAGGCCATCGCAATCAGTGCAGGCCCTGCCGGCT
GAAGAAGTGCCTACAAGCAGGCATGAACCAAGATGCTGTGCAGAATGAGCAGCAACCTCGGAGCATGGCT
CAGGTCCACCTGGATGCCATGGAAACAGGCAGTGACCCCCGATCGAAACCAAGTGGTAGCCTCTCGCTC
TGGCAGGGCCAGTCCCCGGGCCCCACGTCGTGTCGTGCAACCAGGCCATGGGCCACCACTTATGGC
CAGCCTTATCACCGCCAAACTTGTCTAAACTGGAGCCAGGGACGCTGAAGAGAATATTGATGTCACC
AGCAATGACCCGAGTCCCCGATCCCCGATCCCCCTGCAGTCTGGATGGCATCCATGAGACATCTGCTCGCTGC
TCTTCATGGCTGTCAAATGGGCAAAACTTGCCTGTGTTTCCAACCTGCCCTTCCGGGACCAGGTGAT
CTTGCTGGAAGAGGCATGGAATGAGCTTTCCCTTGGAGCCATACAGTGGCTCTGCCCTGGACAGC
TGCCCCTGCTGGCACCACCTGAGGCGTCCCGAGCTCAGGGCAGGCTGGCTTGGCAGTGCAGAGA
CGCGCTTCTGCAGGAAACCATCTCCGGTCCGAGCTCTGGCAGTGGATCCACAGAGTTGCCCTGCCT
GAAGGGCCCTGGCTCTTCAAACTGAAACACAGAGGCCCTGAAGGATCCTGAGCACGTGGAGGCTTGCAG
GACCAGTCCCAGGTGATGCTAACGCCAGCATAGCAAGGCTCACCAACCCAGCCAGCCTGTGAGGTTGGGA
AATTGCTCCCTGCTCCATCTTGAGGTTCCCTACGGCTGAGCGCATTGAGCTCTTCTTCAGAAA
GACCATAGGGAACACTCGATGGAGAAGCTCTGTGACATGTTCAAAACTAGTTGGAGTGCCAAGT
GTCCACAGGCACCCAGGGGGCAGCACATCTAGAAGCTAAATAGTCCCTGCCCTTCAGCCAGTAAT
TCCACATTCAAGGTATTCCTACCTAGCAGAAATTCTCCAAAATATTATTGGCATATTGCATC
CTAATCTTAATACCCCTAACTCTGCTTGGCAGTGAATGCATGGATGCGTTATTCATAGGAGAA
ACAGCTTGGCAAA
(SEQ ID NO: 19)

Targeting Vector (5' arm; 200 bp flanking neo insert):

AGACTGAAAGACAGACAGACAGACAGACAGACAGGGTTAAAGATGGATGCATGGTTGGGCCAGCAACT
TCTAGCAAGCAGGCTACCCCTAGGACCATCCATATCCGATGAGCTCTACAGTGGCTGCCTCCACTATG
CCTGTGTCTGTGGCGGCCCTCAAGAAGGAGTCTCAGGTAGATGGGCCCTGGAGAGGATCCAAC
(SEQ ID NO: 20)

Targeting Vector (3' arm; 200 bp flanking neo insert):

CTCCAGTGCCAGTGTTGGGACAGCAGCAGTGGAAACATTATGGCATCTATGCCCTGCAATGGCTG
CAGTGGCTTCTTCAAGAGGGAGTGTGAGAAGGAGGCTCATCTACAGGTGCCACAGCTCTGCCGGCCTG
CCCCGGTGTGCCTAGCACGGTGGAGGGCGTCAGGGAAAGCGGAAGACGAGACCAGGGCAAACA
(SEQ ID NO: 21)

FIG. 8